

REMARKS

Claims 1 and 4 are now pending in the application. Claims 1 and 4 stand rejected. Claims 2-3 and 5-16 were cancelled after being withdrawn from consideration. The Examiner is respectfully requested to reconsider and withdraw the rejections in view of the remarks contained herein.

INTERVIEW SUMMARY

Applicants thank the Examiner for the interview on April 16, 2010 with Applicants' undersigned representative. The Examiner and Applicants' representative discussed amending the claims to include the less than about 100-second steady state attaining feature of the fuel cell stack. This feature was highlighted in the Declaration of the inventor Steven Falta submitted March 24, 2010. No agreement was reached on the allowance of the claims.

REJECTION UNDER 35 U.S.C. §§ 102/103

Claims 1 and 4 stand rejected under 35 U.S.C. §102(b) as being anticipated by DiPiermo Bosco et al. (U.S. Patent No. 6,103,409). This rejection is respectfully traversed.

At the outset, Applicants have amended Claim 1 to recite that the fuel cell stack attains a steady state in less than about 100 seconds at a sampling of about 10 Hz or greater.

Rejection Under §102 – DiPiermo Bosco et al.

Applicants respectfully assert that the DiPiermo Bosco et al. patent does not anticipate Applicants' claims because the DiPiermo Bosco et al. patent does not disclose a fuel cell able to attain a steady state in less than about 100 seconds at a sampling of about 10 Hz or greater. To the contrary, Figure 4 (below) of the Di Piermo Bosco et al. patent demonstrates that a reasonably steady state in the fuel cell is achieved after about 1000 seconds elapse.

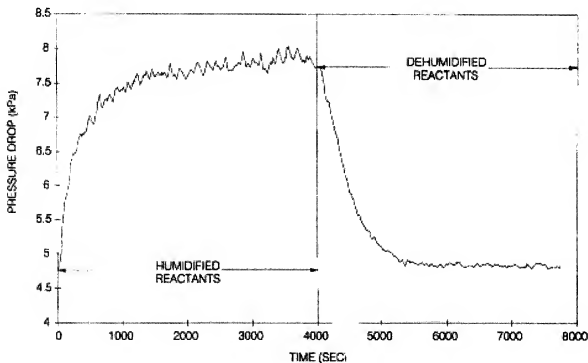


FIG. 4

Additionally, the DiPiermo Bosco et al. patent and data/fuel cell combination is distinguishable from Applicants' claimed invention on the basis that Applicants' invention includes "a collection of the set of differential pressure signals' measured during operation of the fuel cell" and a system controller having executable logic for

generating a set of differential pressure signals and determining a root-mean-square value from "only said collection of the set of differential pressure signals" to control the vaporized water source — without reliance on an *a priori* data set.

Accordingly, there is no anticipation by the DiPierno Bosco et al. patent.

Rejection Under §103 Based on DiPierno Bosco et al. and Secondary Considerations Including a Declaration of Steven Falta

With respect to the §103 rejection, the Office Action points to no reason from the DiPierno Bosco et al. disclosure, or elsewhere in the prior art, to modify the DiPierno Bosco et al. fuel cell with Applicants' control of fuel cell humidification in a way that can achieve a steady state in less than about 100 seconds at a sampling of about 10 Hz or greater.

Applicants' invention offers unexpected benefits compared to the DiPierno Bosco et al. system. Applicants' claimed invention provides sensitivity and speed of measurement which is not disclosed, taught by, or inherent in the DiPierno Bosco et al. system which is limited to measurements based on the reference fuel cell.

The Declaration of Steven Falta, submitted March 24, 2010, further supports Applicants' unexpectedly improved speed and sensitivity of the claimed fuel cell. The improvements are best illustrated in that the pressure drop indication based on the differential fluctuations provides a reasonable steady-state condition after an elapsed time of only 100 seconds. Additionally, for example, Applicants' invention facilitates sampling at 10 Hz or greater which is much more amenable to automotive fuel cell operation where the dynamic load following operation rarely allows for greater than

several minutes at a fixed load condition. Paragraph [0044]. Further, Applicants' system achieves a relatively steady state after 100 seconds. Figures 4 and 6.

In comparison, the DiPierro Bosco et al. pressure drop indication attains a reasonable stead-state condition after an elapsed time of 1000 seconds. Figure 4 of DiPierro Bosco et al. In this example, Applicants' claimed invention provides a 10-fold increase in speed and in sensitivity. Applicants assert that, even if a *prima facie* case of obviousness had been made, the unexpected results provide a secondary consideration evidencing patentability which Applicants assert weigh in favor of patentability and non-obviousness. See *Graham v. John Deere Co.*, 383 U.S. 1, 148 USPQ 459 (1966); *In re Sullivan*, 84 USPQ2d 1034 (Fed. Cir. 2007).

Additionally, Applicants maintain that the root-mean-square calculated during fuel cell operation is different from the DiPierro Bosco et al. comparison to pressure drop in an unflooded reference stack. Applicants' parameter is based on the statistical value, root-mean-square, determined from the executable logic based on a "collection of the set of differential pressure signals of the fuel cell." Applicants' claimed fuel cell stack which includes the data is thus patentable over the DiPierro Bosco et al. patent disclosure.

As such, Applicants' claimed fuel cell provides "an accurate determination of the onset of flooding status and control" and "optimization of stoichiometry with a comparable optimization of air compressor capacity, efficient management of rapid power transits, and data for effective management of stack purge." Paragraph [0054].

As DiPierno Bosco et al. do not disclose, teach, or provide a reason to make Applicants' claimed fuel cell system, reconsideration of the claims and removal of these rejections are respectfully requested.

Rejection Under §103 Based on DiPierno Bosco et al. and Eryurek

Claims 1 and 4 stand rejected under 35 U.S.C. §103(a) as being unpatentable over DiPierno Bosco et al. (U.S. Patent No. 6,103,409), as described above in view of Eryurek et al. (U.S. Patent No. 6,539,267). This rejection is respectfully traversed.

The Eryurek et al. patent fails to supplement the teachings of DiPierno Bosco et al. to provide Applicants' claimed fuel cell stack that achieves a steady state in less than about 100 seconds at a sampling of about 10 Hz or greater. Applicants' combination of features in the claimed fuel cell stack provides "an accurate determination of the onset of flooding status and control" and "optimization of stoichiometry with a comparable optimization of air compressor capacity, efficient management of rapid power transits, and data for effective management of stack purge." Paragraph [0054]. As stated above, the unexpected benefits of Applicants' claimed system, including the increased speed and sensitivity are detailed in the Declaration of Steven Falta.

The cited art fails to provide any guidance, instruction, or reason for a skilled artisan to modify the teachings of the DiPierno Bosco et al. and the Eryurek et al. patents and process controls to arrive at a steady state condition in less than about 100 seconds at a sampling of about 10 Hz as claimed by Applicants. Such details are necessary for a case of obviousness. See *In re Kahn*, 441 F.3d 977, 988, 78 USPQ2d 1329, 1336 (Fed. Cir. 2006) ("[R]jections on obviousness grounds cannot be sustained

by mere conclusory statements; instead, there must be some articulated reasoning to support the legal conclusion of obviousness.") MPEP §2143 states that "[t]he key to supporting any rejection under 35 U.S.C. 103 is the clear articulation of the reason(s) why the claimed invention would have been obvious," which should be made explicit, as directed by *KSR Int'l Co. v. Teleflex Inc.*, 127 S. Ct. 1727 (2007). This burden is not met in the present rejection based on the combination of the DiPierro et al. patent and the Eryurek et al. patent.

Further, the Eryurek et al. patent uses stored (or trained) values and rules. Accordingly, the data is collected *a priori* for the system. Similarly, DiPierro Bosco requires an *a priori* collection of data for the anode and cathode pressure drops at every combination of flow and electrical load conditions expected to be encountered during fuel cell operation. Thus, the combination teaches an *a priori* collection of data for a fuel cell that does not achieve a steady state in less than about 100 seconds at a sampling of about 10 Hz or greater.

The person of ordinary skill in the art could not have expected the astonishing increase in sensitivity provided by Applicants' claimed fuel cell stack, as described by Mr. Falta in his Declaration. Thus, even if the references were properly combinable to show *prima facie* obviousness, the evidence of unexpected results would overcome the showing.

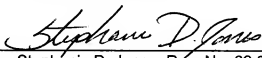
Accordingly, the combination of the DiPierro Bosco et al. patent and the Eryurek et al. patent fails to teach or suggest Applicants' claimed invention. Reconsideration and withdrawal of the §103 rejection of the claims are respectfully requested.

CONCLUSION

Applicants believe that all of the stated grounds of rejection have been properly traversed, accommodated, or rendered moot. Applicants therefore respectfully request that the Examiner reconsider and withdraw all presently outstanding rejections. Applicants believe that a full and complete response has been made to the outstanding Office Action and the present application is in condition for allowance. Thus, Applicants request prompt and favorable consideration. If the Examiner believes that personal communication will expedite prosecution of this application, Applicants invite the Examiner to telephone the undersigned at (248) 641-1600.

Respectfully submitted,

Dated: April 16, 2010

By: 
Stephanie D. Jones, Reg. No. 62,038
Anna M. Budde, Reg. No. 35,085

HARNESS, DICKEY & PIERCE, P.L.C.
P.O. Box 828
Bloomfield Hills, Michigan 48303
(248) 641-1600

AMB/SDJ/tp

15443837 1